AUG 12 1926

STATISTICAL BULLETIN
Metropolitan Life Insurance Co.

VOL. VII JULY, 1926 No. 7

AUTOMOBILE ACCIDENTS AND TRAFFIC DENSITY

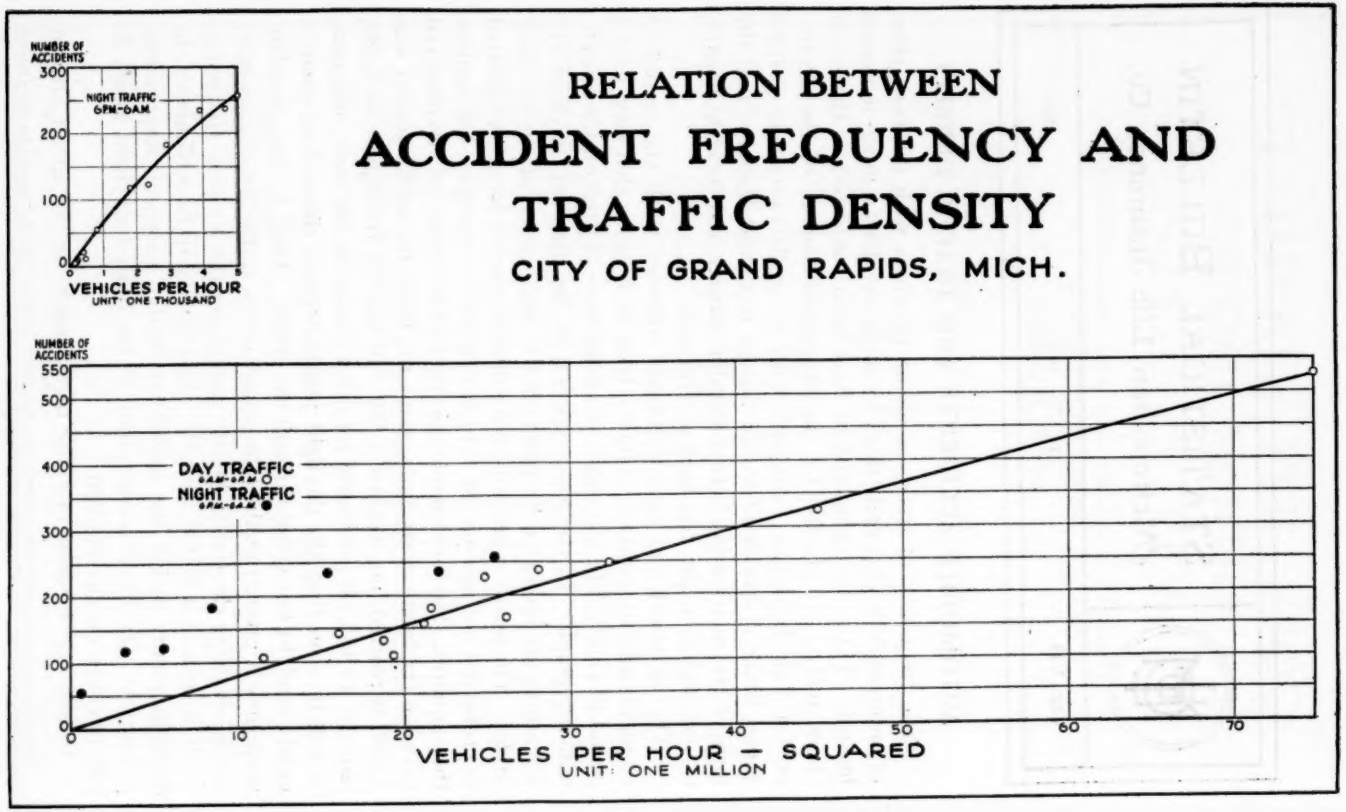
The frequency of street accidents increases with the congestion of automobile traffic, and travel by night involves a much increased hazard. These two propositions have been confirmed as the result of an analysis conducted by the Statistical Bureau of the Metropolitan Life Insurance Company with the collaboration of Colonel James Sinke, Director of Public Safety in Grand Rapids,* and the form of the relationship between traffic density and accident hazard, by day and by night, has been ascertained.

The authorities of Grand Rapids collected both the record of accidents and the count of vehicles, hour by hour, in that city, over a period of time. The data thus obtained were plotted on the accompanying graph. In the lower portion of the diagram, daylight observations are indicated by plain circles, night observations by black circles. The points representing accident frequency have been plotted as ordinates, not against the vehicle densities themselves, but against their squares. So, for example, an accident frequency of 106 observed between the hours of six and seven a.m., when the traffic density was 3,389, is plotted, not against 3,389, but against the square of 3,389, namely, 11,485,321; similarly for other points on the lower diagram. It will be seen that the daylight points arrange themselves about a nearly straight line going through the origin. Thus, by day, accident frequency is proportional to the square of the traffic density; in other words, *doubling* the traffic density *quadruples* the accident frequency.

It is seen at a glance that the night points all lie well above the daylight points within the somewhat limited range of observations procurable. Traffic densities equal to the busiest daylight hours do not, of course, occur at night.

It will also be seen that the night points do not at all arrange

*Further interesting data will be found in a pamphlet entitled "Think," issued by the Department of Public Safety, Grand Rapids, Michigan.


NUMBER OF ACCIDENTS
300
200
100
0
NIGHT TRAFFIC 6PM-6AM.
0 1 2 3 4 5
VEHICLES PER HOUR
UNIT: ONE THOUSAND
RELATION BETWEEN
ACCIDENT FREQUENCY AND
TRAFFIC DENSITY
CITY OF GRAND RAPIDS, MICH.
NUMBER OF ACCIDENTS
550
500
400
300
200
100
0
DAY TRAFFIC 6AM-6PM
NIGHT TRAFFIC 6PM-6AM
10 20 30 40 50 60 70
VEHICLES PER HOUR — SQUARED
UNIT: ONE MILLION

themselves about a straight line on the lower diagram. Although in every case the night points lie above the daylight points, the contrast is much greater at lower traffic densities than at higher traffic densities. In other words, though night traveling is always more dangerous than day travel, this is most marked when the streets are comparatively deserted, and when, in consequence, there is perhaps temptation for reckless driving, regardless of the danger caused by the darkness.

The law which connects accident frequency with traffic density at night is not represented by a straight line in the lower diagram. In the small inset at the top of the drawing accident frequency has been plotted simply against the traffic density itself (in the first power). It will be seen that in the case of the night points this method of plotting gives nearly a straight line, so that at night accident frequency is approximately proportional to the traffic density itself. In other words, by night, doubling traffic density only doubles accident frequency, instead of quadrupling it, as in the day-time.

MORTALITY RECORD OF THE FIRST SIX MONTHS OF 1926.

Health conditions among the wage-earning populations of the United States and Canada during the first half of 1926 were not only less favorable than for the same period of last year but of any year since 1920. The increased mortality in the first six months of 1926 was due, for the most part, to above-average prevalence of influenza and pneumonia. It will be recalled that in 1920 the country experienced a very severe recrudescence of the 1918 influenza pandemic resulting in a very unfavorable deathrate during the early part of that year. But in the latter half of 1920, the health situation took a surprising turn for the better; and when the year had run its course, it was found that the mortality of the industrial population had actually registered the minimum rate, up to that time. General population mortality statistics likewise showed that with a single exception, 1920 had registered a lower deathrate than any previous year. What occurred in the second half of 1920 suggests strongly that the 1926 influenza flurry constitutes, in itself, no real ground for pessimism as to the final health record for this year. It is still entirely possible that sufficient improvement will develop in the latter half of 1926 to counterbalance the high rate of the first half of the year. Up to July 10, the cumulative deathrate of 1926 was only four per cent. above that for the corresponding period of 1925.

In addition to the higher rates for influenza and pneumonia,

increases have been recorded for measles, organic heart disease, chronic nephritis, and cerebral hemorrhage. These increases have more than counterbalanced the improvement in the record of diphtheria, tuberculosis, diarrheal diseases, puerperal conditions, and accidents.

This year bids fair to be the worst, with respects to deaths from measles, that the children of American and Canadian wage-earners have experienced since the Metropolitan began, in 1911, to keep records of its mortality experience for individual diseases. The rate 17.6 per 100,000 white persons exposed was exactly four times as high as was recorded last year.

The higher deathrates in 1926 for organic heart disease, Bright's disease, and cerebral hemorrhage, are due, in part, to the influenza outbreak. Above-average prevalence of influenza hastens the deaths of many persons suffering from chronic diseases, and this is invariably reflected in increased mortality from these "degenerative conditions."

Tuberculosis mortality among white Industrial policyholders has continued to decline this year, but there has been a rather marked retardation of the *rate of decline*. This development is by no means discouraging, as we could hardly expect an indefinite continuation of the very marked drop which the tuberculosis deathrate has been showing in recent years, and which amounted to 51 per cent. among Metropolitan Industrial policyholders between 1915 and 1925. The tuberculosis record of the colored policyholders is by no means so good. An increase was recorded both over last year and two years ago.

One of the most gratifying items in the health report of the Industrial policyholders is a pronounced decline among both white and colored in the mortality from diarrheal diseases. Marked improvement among the whites and a slightly better record for the colored is in evidence for diseases incidental to pregnancy and childbirth. The principal item in this group is puerperal septicemia in which the improvement is confined to the whites.

Deaths from alcoholism among Metropolitan Industrial policyholders during the first six months of 1926 totalled 308, and the deathrate was 3.6 per 100,000. This is the highest deathrate for this disease for the first half of any year since 1917. These figures may be compared with 242 deaths and a rate of 3.0 for the corresponding period of 1925, and with rates of 3.1, 3.4 and 2.0 in the same period of 1924, 1923, and 1922, respectively. The increase, as compared with the corresponding months of last year, amounts to twenty per cent.

Deaths from cirrhosis of the liver, which is closely associated with

alcoholism, numbered 598, corresponding to a deathrate of 6.9 per 100,000, as compared with a rate of 6.7 for the corresponding period of 1925. In the first half of 1924 the rate was 6.0.

Since January 1st, 1922, a period of four and one-half years, alcoholism has caused 1,965 deaths among Metropolitan Industrial

Deathrates per 100,000 Exposed. First Six Months of 1924, 1925 and 1926 Compared. By Color for Principal Causes of Death. Industrial Department, Metropolitan Life Insurance Company, Premium-Paying Business.

Cause of Death	Deathrates per 100,000 Persons Exposed					
	White			Colored		
	Jan.-June. 1926	Jan.-June. 1925	Jan.-June. 1924	Jan.-June. 1926	Jan.-June. 1925	Jan.-June. 1924
All Causes of Death	947.0	894.2	905.2	1703.2	1612.9	1556.4
Typhoid fever	2.4	2.3	2.6	4.7	6.3	5.4
Measles	17.6	4.4	13.3	13.4	3.2	8.2
Scarlet fever	4.9	5.4	6.8	1.5	1.2	1.0
Whooping cough	10.8	7.1	7.7	14.0	13.7	13.1
Diphtheria and croup	9.9	12.7	16.7	6.4	5.3	4.8
Influenza	44.9	29.0	19.6	94.2	71.4	52.5
Meningococcus meningitis	.9	1.0	.8	.7	.7	1.1
Tuberculosis—All forms	86.4	88.9	96.6	247.8	239.2	246.6
Tuberculosis of respiratory system	76.0	77.9	86.0	217.0	208.3	223.2
Tuberculosis of meninges, etc.	5.0	5.4	5.8	7.9	9.1	7.2
Other forms of tuberculosis	5.4	5.6	4.8	22.9	21.7	16.2
Cancer	72.8	70.7	70 7	69.0	72.8	73.4
Diabetes	17.8	16.9	16.0	16.7	15.9	15.4
Alcoholism	3.4	2.8	2.9	4.9	4.2	4.3
Cerebral hemorrhage; apoplexy	54.2	53.3	59.2	104.1	91.0	103.0
Organic diseases of the heart	139.5	128.1	124.0	226.0	232.1	214.4
Total respiratory diseases	137.7	118.0	122.8	284.5	239.0	243.2
Bronchitis	5.8	6.1	6.2	11.0	9.8	11.3
Bronchopneumonia	57.0	44.5	49.3	99.9	74.8	76.8
Pneumonia—lobar and undefined	66.8	58.9	58.2	160.1	139.3	141.9
Other dis. of respiratory system	8.1	8.4	9.1	13.4	15.0	13.2
Diarrhea and enteritis	17.6	19.8	20.9	20.6	27.1	18.7
Under 2 years	14.9	16.7	17.6	15.3	19.5	12.7
2 years and over	2.8	3.1	3.3	5.3	7.6	6.0
Acute nephritis	4.5	5.0	5.0	17.4	16.0	16.8
Chronic nephritis	70.7	67.6	64.8	141.0	131.9	115.5
Total puerperal state	15.5	17.0	17.6	25.2	25.5	26.9
Puerperal septicemia	5.9	6.5	6.7	11.7	11.6	10.0
Puerperal albuminuria & convulsions	3.4	3.8	4.6	6.1	5.6	7.2
Other diseases of puerperal state	6.2	6.8	6.3	7.4	8.3	9.7
Total external causes	65.1	70.8	66.6	113.7	109.9	100.9
Suicides	7.6	7.2	7.5	5.9	4.3	4.8
Homicides	3.0	3.5	2.7	34.1	33.0	31.5
Accidental and unspecified violence	54.5	60.1	56.3	73.7	72.6	64.6
Accidental drowning	4.0	4.6	4.9	3.5	5.2	4.4
Automobile accidents	14.2	13.6	12.9	13.5	11.3	11.7
All other and ill-defined causes of death	170.3	173.1	170.6	297.4	306.5	291.6

policyholders. Of these deaths, 1,943 occurred among approximately 16,000,000 persons living in the United States, while only 22 were recorded among approximately 1,000,000 Canadian policyholders. Most of the few deaths from alcoholism among Canadians insured in the Metropolitan's Industrial department, during recent years, have occurred among approximately 360,000 policyholders in the Province of Ontario.

Deaths from wood and denatured alcohol poisoning numbered 10 during the six months' period. During the same months of 1925 and 1924, there were 15 and 8 deaths respectively. Deaths from this form of acute poisoning are unquestionably less frequent than they were in 1920 and 1921. Prior to these years, however, it was a comparatively rare occurrence to have a death reported from this cause.

A check of the Metropolitan's mortality records, by quarters, over a long series of years, shows that the mortality from alcoholism has a seasonal incidence. Although this is not very pronounced, it is nevertheless a fact that more deaths, on the average, occur during the first quarter of the year than in any of the other three months' periods.

Suicides have been more numerous this year and homicides a little less frequent. Accidental drownings have also registered a lower deathrate.

The record of the half-year for automobile fatalities is bad. The rate has increased among both white and colored policyholders, particularly the latter. It is true that among the whites the increase as compared with last year is not large (4½ per cent.); but the fact remains that an increase has again been recorded. Even a stationary rate for automobile fatalities would be a challenge to every organization interested in public safety problems.

DEATHRATE AMONG THE INDUSTRIAL POPULATIONS OF AMERICAN STATES AND CANADIAN PROVINCES

Supplementing the tabulation which appeared in the January *Statistical Bulletin*, showing the deathrates for 1925 for the entire group of 17,000,000 Metropolitan Industrial policyholders, there are now available similar statistics for policyholders in the individual states and in the provinces of Canada. These statistics have a unique value, constituting, as they do, the earliest indication of comparative health conditions in the urban populations of each state and province and the *only* comparative index of the relative mortality among the great urban industrial populations of the several states. The present article deals with the deathrate for all causes combined. It is planned

to follow it with similar articles relating to several of the more important causes of death.

It is important, in comparing the rates shown in the table on page

Deathrates per 100,000 Persons Exposed. All Causes of Death. By Geographic Division, State and Province. Metropolitan Life Insurance Company, Industrial Department, 1925. (Excluding Infants under One Year of Age)

Geographic Division	Rates per 100,000	
	White	Colored
Total Company	761.0	1419.4
United States	772.2	1421.1
New England	762.6	1272.6
Maine	622.1	*
New Hampshire	659.4	†
Vermont	648.6	*
Massachusetts	777.1	1276.2
Rhode Island	866.3	1093.4
Connecticut	765.0	1320.5
Middle Atlantic	898.3	1265.7
New York	925.1	1302.6
New Jersey	870.5	1247.4
Pennsylvania	870.2	1241.5
East North Central	657.0	1366.6
Ohio	723.0	1357.3
Indiana	724.8	1290.9
Illinois	635.3	1340.9
Michigan	614.7	1581.3
Wisconsin	537.9	1829.2
West North Central	685.9	1503.1
Minnesota	485.3	1524.4
Iowa	571.5	1186.2
Missouri	774.7	1568.6
Nebraska	553.3	1207.3
Kansas	711.4	1491.1
South Atlantic	801.0	1510.4
Delaware	667.2	1093.6
Maryland	985.5	1730.6
District of Columbia	787.2	1348.1
Virginia	834.6	1471.1
West Virginia	629.7	1409.7
North Carolina	705.6	1583.2
South Carolina	767.3	1794.8
Georgia	708.9	1471.8
Florida	774.9	1510.0
East South Central	771.0	1645.8
Kentucky	762.8	1588.0
Tennessee	772.7	1655.2
Alabama	784.9	1438.0
Mississippi	766.2	7622.4
West South Central	718.4	1497.8
Arkansas	620.7	1690.4
Louisiana	800.9	1417.2
Oklahoma	562.0	1547.3
Mountain	482.7	1448.6
Montana	430.8	*
Idaho	473.3	*
Colorado	837.1	1362.3
Utah	321.8	*
Pacific	589.7	1279.1
Washington	427.6	1766.4
Oregon	508.2	1601.2
California	645.0	1211.2
Canada	630.0	929.9
Eastern Provinces	669.6	*
Nova Scotia	898.2	*
New Brunswick	506.8	*
Quebec	715.5	*
Ontario	586.1	*
Western Provinces	351.3	*
Manitoba	394.3	*
Saskatchewan	311.1	†
Alberta	341.9	*
British Columbia	342.8	*

*Death rate not calculated on account of small number of colored policyholders.
†No deaths.

7, to remember that Metropolitan Industrial policyholders reside almost entirely in the cities, and that they constitute a group made up, very largely, of wage-earners and their dependents. Important, therefore, as these figures are, they are not to be taken as indicating definite health conditions in the *entire* populations of the various states; and this is especially true of those states which have large rural populations. The rates quoted in the following text are for white persons only.

The lowest regional deathrate among American and Canadian wage-earners, in 1925, was that for the Western Provinces of Canada, where the remarkably low figure of 3.5 deaths per 1,000 policyholders was recorded. The deathrate among the industrial population of the cities of Saskatchewan (3.1 per 1,000) was lower than in any other Canadian province or American state.

The Mountain States rank next to the Western Provinces of Canada and show a much better health record than any group in the United States. Utah, where the Metropolitan has about 87,000 Industrial policyholders, has far and away the best mortality record of any American state, and Montana with some 50,000 policyholders shared with Washington the distinction of second rank. The relatively high rate in Colorado is due, very largely, to the fact that a large number of persons in poor health go to that state to take advantage of its health-giving climate. Naturally the mortality among those persons is much above the average. The Pacific Coast region is the third group in order and each of the three states had a deathrate well below that for the urban industrial population of the United States. The East North Central States ranked fourth with a deathrate of 6.6 per 1,000. The Eastern Provinces of Canada showed a deathrate of 6.7 per 1,000 and ranked fifth. The West North Central group ranked sixth and the West South Central states, seventh. The six New England States, as a group, ranked eighth, recording a deathrate of 7.6 per 1,000, or slightly below that for the urban Industrial population of the country (7.7). In the East South Central States, which were ninth in order, the deathrate was identical with that for the entire group of Metropolitan Industrial policyholders in the United States, namely, 7.7 per 1,000. The South Atlantic States, as a group, had an above-average deathrate. This was due, for the most part, to unfavorable records for Virginia and Maryland. The latter state, with more than 400,000 Industrial policyholders, had a deathrate higher than in any state or province.

The most unfavorable record, in either the United States or Canada, was that for the Middle Atlantic States, (New York, New Jersey, and Pennsylvania) with a rate of 9 per 1,000 white policyholders. The figure for New York (9.3) was exceeded by only one state in the country, Maryland. Nearly 4,000,000 persons in these three states are insured in the Company's Industrial Department.

All of the figures quoted, as we have already indicated, relate to white persons only. Among more than 2,000,000 colored policyholders the deathrate was almost double that for the whites.

THE RECENT TREND OF PUERPERAL MORTALITY

During the past decade there has occurred a wide extension of nursing and of other measures directed toward the prevention of the serious and often fatal complications of the puerperal state. Public and private agencies have endeavored to provide instruction and supervision for pregnant women, increasingly stringent regulations of midwifery have been instituted, hospital service in confinement has been much improved and made widely available, and post-natal care has been provided through public health nursing agencies working in the home. It is of interest, therefore, to examine the Census Bureau's records of the mortality from abnormalities associated with childbearing for an area of the United States* where much of the admitted improvement in maternity service has taken place during the past ten years.

There seems to have been a slight increase in the deathrate for puerperal conditions reckoned against births in a constant area. This is clear from a comparison of the rates for the two periods 1915-1917 and 1921-1923. The deathrates for puerperal sepsis and puerperal eclampsia have remained unchanged. These two conditions account for more than one-half of the mortality connected with childbearing. Most of the preventive effort of agencies for maternal care has been directed at these two conditions.

Some improvement in the mortality figures has been observed in rural districts of these nine states. But here we have to consider the effect of improvement in birth registration. An increase in the proportion of births registered would tend to decrease puerperal mortality rates based upon births.

The fact that there has been no significant improvement in maternal mortality rates during the period under review should provoke inquiry. What could have been expected of the maternity work which was instituted with such fervor and zeal ten years ago? Was it founded upon sound principles, were its aims realizable, and was there a programme sufficiently comprehensive to affect the vast number of maternity cases which occur annually in the area under survey? Or, have new factors intervened to offset the work of boards of health and of private agencies? Has the increased proportion of hospitalized cases been accompanied by more septic complications? Whatever be the answers to these and other questions which arise, it is clear that over the past decade little if any impression seems to have been made upon the risk of death in childbearing.

HEALTH RECORD FOR JUNE, 1926.

The June deathrate among Metropolitan Industrial policyholders (9.5 per 1,000), while higher than the figure registered for the preceding month, shows a slight improvement over the rate for June a

*Conn., D.C., Me., Mass., Mich., Minn., N. H., N. Y., Pa., Vt.

year ago. This is about the average June deathrate for the industrial populations of the United States and Canada for the last five or six years. The general health situation in June was satisfactory, with no widespread epidemics and relatively few outbreaks of the contagious and infectious diseases.

Increases over the May mortality rate were recorded for tuberculosis, cancer, cerebral hemorrhage, organic heart disease, Bright's disease, diarrheal diseases, accidents, and automobile fatalities. Four of these causes, tuberculosis, cancer, cerebral hemorrhage, and automobile accidents, also registered higher deathrates than in June, 1925. The mortality from influenza and pneumonia, on the other hand, declined appreciably in June, although in the case of each the rate was much higher than for the same month a year ago. The June rate for influenza-pneumonia, is, nevertheless, a considerably above-average figure for that month, and in spite of the seasonal decline now being observed it is evident that the 1926 influenza outbreak is still showing its effect on the general mortality rate.

High mortality from measles continues to prevail, the June deathrate for that disease (15.0 per 100,000) being the highest, with a single exception, ever recorded for that month among Metropolitan Industrial policyholders. A high measles prevalence has been noted this year throughout the country. The decline from May was only slight. There was a little improvement in the whooping cough situation in June. The scarlet fever rate rose somewhat, while that for diphtheria continued low and was substantially unchanged from the figures recorded in May, 1926, and in June, 1925. The increase as compared with May in the mortality from diarrheal diseases is a seasonal one; and indeed one of the most favorable items in the June mortality report is the very considerable decline in the deathrate for these diseases from the figure recorded in June a year ago. This has taken place despite the increased number of infant lives exposed to risk.

The general deathrate for the large cities of the United States in June was 12.0 per 1,000, which was lower than in the preceding month and in June, 1925. As compared with May there was greater prevalence of malaria, poliomyelitis, scarlet fever, and typhoid fever, with fewer cases of diphtheria, influenza, whooping cough, and smallpox. Comparison with June a year ago shows increases in smallpox and typhoid fever cases, but declines in the other diseases just mentioned.

Reports concerning the epidemic diseases of childhood show a slight but quite general decline for diphtheria and a more pronounced drop in measles cases. This disease is still epidemic in many communities, including Portland, Oregon.

METROPOLITAN LIFE INSURANCE COMPANY

Deathrates* per 100,000 for Principal Causes, Premium-paying Business in Industrial Department (Annual Basis)

MONTHS OF MAY, 1926; JUNE, 1926, AND OF JUNE, 1925

CAUSES OF DEATH	RATE PER 100,000 LIVES EXPOSED*			
	June, 1926	May, 1926	June, 1925	Year 1925†
TOTAL—ALL CAUSES	950.5	913.8	959.0	906.9
Typhoid fever	3.0	1.8	3.1	4.6
Measles	15.0	16.6	7.2	3.3
Scarlet fever	4.8	3.4	3.4	3.5
Whooping cough	10.3	11.0	9.1	7.7
Diphtheria	8.9	8.6	8.4	10.6
Influenza	21.1	38.5	13.1	21.9
Tuberculosis (all forms)	110.4	98.8	108.8	98.0
Tuberculosis of resp'y system	97.7	86.4	93.6	85.8
Cancer	74.1	65.5	70.2	70.5
Diabetes mellitus	15.5	14.0	15.3	15.2
Cerebral hemorrhage	54.1	50.2	52.4	53.5
Organic diseases of heart	135.8	126.6	137.3	126.6
Pneumonia (all forms)	83.5	108.4	75.8	86.5
Other respiratory diseases	13.1	12.5	12.3	13.3
Diarrhea and enteritis	23.6	15.4	31.6	36.6
Bright's disease (chronic nephritis)	73.9	69.6	74.5	69.8
Puerperal state	16.3	15.2	17.6	16.5
Suicides	7.8	7.8	6.6	6.9
Homicides	7.6	5.9	7.3	7.2
Other external causes (excluding suicides and homicides)	65.7	53.6	90.3	64.2
Traumatism by automobiles	18.8	14.9	16.2	16.5
All other causes	205.8	190.6	214.9	190.5

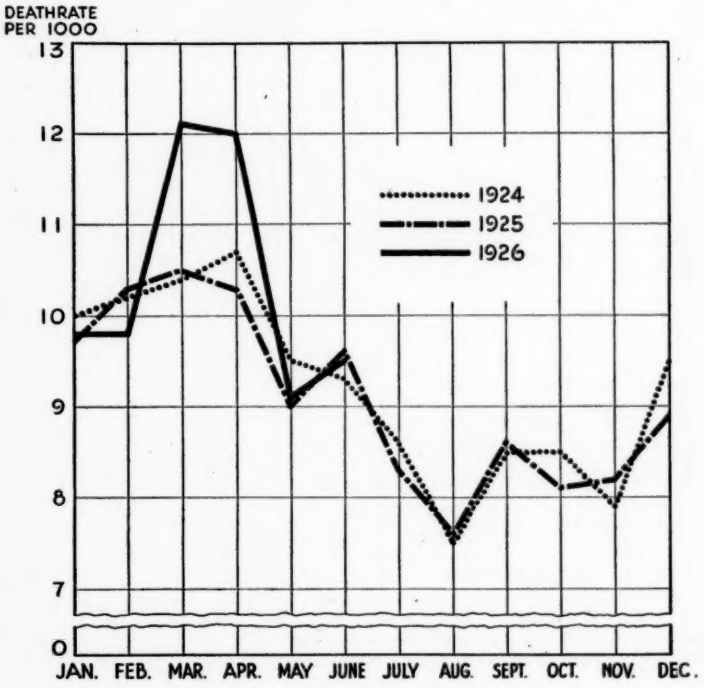
*All figures include infants insured under one year of age.
†Based on provisional estimate of lives exposed to risk in 1925.

Correspondence on the subjects discussed in these BULLETINS may be addressed to: The Editor,

STATISTICAL BULLETIN
Metropolitan Life Insurance Company,
1 Madison Avenue, New York City.

DEATHRATE PER 1000
IN SPECIFIED MONTHS OF
1924, 1925, 1926

METROPOLITAN LIFE INSURANCE COMPANY
INDUSTRIAL DEPARTMENT
(ANNUAL BASIS)



	1924	1925	1926		1924	1925	1926
JAN.	10.0	9.7	9.8	JULY	8.6	8.3	
FEB.	10.2	10.3	9.8	AUG.	7.5	7.6	
MAR	10.4	10.5	12.1	SEPT.	8.5	8.6	
APR.	10.7	10.3	12.0	OCT	8.5	8.1	
MAY	9.5	9.0	9.1	NOV	7.9	8.2	
JUNE	9.3	9.6	9.5	DEC	9.5	8.9	

NOTE: Figures include mortality of infants under one year of age

M. L. I. CO. PRESS—77505—PRINTED IN U.S.A.